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10/577,223	07/26/2006	Hans-Peter Brack	5026-1001	3418

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YOUNG & THOMPSON
209 Madison Street
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Alexandria, VA 22314

EXAMINER

MICALI, JOSEPH

ART UNIT	PAPER NUMBER
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1793

NOTIFICATION DATE	DELIVERY MODE
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06/24/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No. 10/577,223	Applicant(s) BRACK ET AL.	
	Examiner Joseph V. Micali	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/4/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-17, 19-29 and 31-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-17, 19-29 and 31-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1793

DETAILED ACTION

Status of Application

The amendments and argumentation filed on June 4th, 2010 have been entered. Claims 13-17, 19-29, and 31-38 are pending and presented for examination on the merits, as claims 1-12, 18, and 30 have been cancelled and claims 37-38 have newly been added.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 1793

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 13, 21-22, 25-27, 34, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,605,685 by Momose et al, in view of US Patent Pub. No. 2003/0054219 by Won et al and US Patent Pub. No. 2004/0106044 by Kerres.

With respect to independent claims 13, 21, and 37, Momose discloses a method for preparing a membrane to be assembled in a membrane electrode assembly, comprising the step of swelling an ion-conducting membrane coated with an ionically conducting polymeric phase, such as Nafion® membranes, in a liquid containing at least one solvent by controlling the content of solvent in the ion-conducting membrane (**example 1 and column 5, lines 35-50**).

Momose is silent with regards to drying the membrane after the swelling step, and subsequently re-swelling the membrane by immersing in a solvent, such as water, as shown in the specification.

Won is drawn to proton exchange composite membranes and methods for manufacturing fuel cells using the same (**title**). Specifically, Won discloses preparing an ion-exchange membrane by swelling in a suitable solvent several times, and subsequently drying and re-swelling in deionized water (**paragraph 0032**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Momose including drying and re-swelling of the membrane, in view of the teaching of Won. The suggestion or motivation for doing so would have been to prepare the membrane in final product form by removing the suspending solvents (**Won, paragraph 0032**).

Art Unit: 1793

Furthermore, with respect to independent claims 21 and 37, Momose discloses a method comprising the steps of providing a membrane in a pre-swollen state, coating the membrane on both sides with an electrode layer to form a sandwich and hot-pressing the sandwich (**column 5, line 35 – column 6, line 12**).

Finally, however, with regards to the drying limitations, the combination of Momose and Won is silent with regards to the drying step being conducted at an elevated temperature in the range of 120 to 140° C.

Kerres is drawn to the production of polymer membranes (**title**), such as those systems including Nafion® (**paragraphs 0009-0011**). Specifically, Kerres discloses a method in which an ion-conducting membrane is subjected to a swelling step, subsequently dried at a temperature of 100° C to remove the solvent, and finally re-swelled (**paragraph 0047**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the modified process of Momose including a drying step at an elevated temperature of 100° C, in view of the teaching of Kerres. The suggestion or motivation for doing so would have been to employ improved means for the removal of the solvent from the membrane (**Kerres, paragraph 0047**). Furthermore, with regards to a distinction in drying between 100° C and 120° C, examiner maintains such a higher temperature to not be patentably distinguishable, unless applicant can properly show expected results or some criticality of the membrane dried at 120° C vs. 100° C, as **MPEP 2144.05 [R-5] Section II** states, “Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.” As such a variable is in reference to mere drying, examiner believes such an amendment to 120° C is not to

Art Unit: 1793

claim a critical range but rather to circumvent the prior art of record, which such amendment does not successfully do, as this is a non-patentably distinguishable issue.

With respect to claim 22, Momose discloses a catalytic active layer disposed between the electrode layer and the membrane (**column 5, line 66 – column 6, line 12**).

With respect to claim 25, Momose discloses a catalytic active layer comprising ruthenium (**column 5, line 67-68**).

With respect to claim 26, Momose discloses the production of such a membrane electrode assembly (**column 5, line 35 – column 6, line 12**).

With respect to claims 27 and 34, Momose discloses a membrane having a thickness in the range of 100 microns (**column 5, line 35**).

With respect to claim 38, as neither Momose nor Won disclose a drying step preceding the hot-pressing step (**Momose, column 5, line 35 – column 6, line 12; Won, paragraph 0032**), it is to be understood that the membrane would still be in a wet state.

5. Claims 14-16, 19, 29, 31, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,605,685 by Momose et al, in view of US Patent Pub. No. 2003/0054219 by Won et al and US Patent Pub. No. 2004/0106044 by Kerres, as applied to claims 13, 21-22, 25-27, 34, and 37-38 above, and further in view of US Patent No. 5,656,386 by Scherer et al.

With respect to claim 14, Momose, as combined, is silent as to the membrane being a radiation grafted membrane.

Art Unit: 1793

Scherer is drawn to an electrochemical cell, such as a fuel cell. Specifically, Scherer teaches that the membrane between electrodes of the cell is a radiation grafted membrane **(abstract, and column 4, line 27 – column 5, line 5)**.

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the modified process of Momose including employment of a radiation grafted membrane, in view of the teaching of Scherer. The suggestion or motivation for doing so would have been to produce a membrane with long-term stability **(Scherer, column 3, lines 17-28)**.

With respect to claims 15 and 29, Scherer teaches a graft level ranging from 10-40% **(Examples 1-15)**.

With respect to claims 16, 19, 31, and 36, Scherer teaches a crosslinker monomer, such as divinylbenzene, in the grafting solution at around 10-17% as relative to styrene **(Examples 9 and 14)**.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,605,685 by Momose et al, in view of US Patent Pub. No. 2003/0054219 by Won et al and US Patent Pub. No. 2004/0106044 by Kerres, as applied to claims 13, 21-22, 25-27, 34, and 37-38 above, and further in view of US Patent Pub. No. 2004/0062970 by Nomura.

With respect to claim 17, Momose discloses a method characterized in that prior to the swelling step, the membrane is treated in a strong acid solution and then rinsed with water **(column 7, lines 38-45)**. Though Momose teaches these steps, Momose does not specify the time period for treating with a strong acid solution.

Art Unit: 1793

Nomura is drawn to the production of a proton-conducting membrane and fuel cells made by using the same **(title)**. Specifically, Nomura discloses treating the membrane with a strong acid, such as sulfuric acid, for a time of 1 hour, or 60 minutes **(paragraph 0329)**.

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the modified process of Momose including treatment of the membrane in strong acid for a period between 10 and 120 minutes, in view of the teaching of Nomura. The suggestion or motivation for doing so would have been to supply an art-accepted time period for strong acid treatment of a membrane, as Momose is silent to specific time duration **(Nomura, paragraph 0329)**.

Furthermore, **MPEP 2144.05 [R-5]** states that, “Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. ‘[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.’”

7. Claims 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,605,685 by Momose et al, in view of US Patent Pub. No. 2003/0054219 by Won et al, US Patent Pub. No. 2004/0106044 by Kerres and US Patent No. 5,656,386 by Scherer et al, as applied to claims 14-16, 19, 29, 31, and 36 above, and further in view of US Patent Pub. No. 2004/0062970 by Nomura.

With respect to claim 20, Momose discloses a method characterized in that prior to the swelling step, the membrane is treated in a strong acid solution and then rinsed with water

Art Unit: 1793

(**column 7, lines 38-45**). Though Momose teaches these steps, Momose does not specify the time period for treating with a strong acid solution.

Nomura is drawn to the production of a proton-conducting membrane and fuel cells made by using the same (**title**). Specifically, Nomura discloses treating the membrane with a strong acid, such as sulfuric acid, for a time of 1 hour, or 60 minutes (**paragraph 0329**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the modified process of Momose including treatment of the membrane in strong acid for a period between 10 and 120 minutes, in view of the teaching of Nomura. The suggestion or motivation for doing so would have been to supply an art-accepted time period for strong acid treatment of a membrane, as Momose is silent to specific time duration (**Nomura, paragraph 0329**).

Furthermore, **MPEP 2144.05 [R-5]** states that, “Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. ‘[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.’”

8. Claims 23-24, 28, 32-33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,605,685 by Momose et al, in view of US Patent Pub. No. 2003/0054219 by Won et al and US Patent Pub. No. 2004/0106044 by Kerres, as applied to claims 13, 21-22, 25-27, 34, and 37-38 above, and further in view of US Patent Pub. No. 2004/0115499 by Tani et al.

Art Unit: 1793

With respect to claims 23, 28, 32, and 35, Momose, as combined, is silent on the electrode layer being selected from carbon cloth, carbon paper, or carbon felt.

Tani is drawn to a method for producing membrane-electrode structures. Specifically, Tani teaches the use of carbon paper being an electrode layer applied in the form of a hydrophilic slurry, which is then hot pressed to produce a membrane-electrode structure (**paragraphs 0072-0073**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the modified process of Momose including employment of carbon paper, in view of the teaching of Tani. The suggestion or motivation for doing so would have been to supply a carbon substrate for use as an electrode layer (**Tani, paragraphs 0070 and 0072-0073**).

With respect to claim 24 and 33, Tani teaches hot pressing conditions being at a temperature of 80-140° C, a pressure of 1-5 MPa, and a duration of 2-10 minutes (or 120-600 seconds) (**paragraph 0073**). MPEP 2144.05 [R-5] states that, “In the case where the claimed ranges ‘overlap or lie inside ranges disclosed by the prior art’ a *prima facie* case of obviousness exists.”

Response to Arguments

9. Applicant's arguments filed on June 4th, 2010 have been fully considered but they are not persuasive.

With respect to applicant's argumentation, applicant begins (pg. 10) with a hindsight argumentation on using the Kerres reference for disclosing a drying temperature. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense

Art Unit: 1793

necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Examiner is unsure how Kerres falls under a hindsight rejection. The primary references disclose drying but not at an elevated temperature. Kerres discloses drying at an elevated temperature and is within the field of pertinent prior art of the other references as well as the instant application.

Thus, the ordinary artisan, seeking an acceptable drying temperature, would, in fact, look to Kerres, as Kerres discloses an acceptable elevated drying temperature. Applicant then argues irrelevant sections of Kerres, which do not highlight the issue of drying temperature, as a means of discrediting Kerres as a teaching. This is not persuasive, as Kerres is analogous art and applicant has not argued against examiner's rationale/purpose for combination/motivation.

Applicants then moves on to argumentation regarding the amendment of a lower limit drying temperature of 100° C to 120° C. As examiner has stated above, examiner maintains such a higher temperature to not be patentably distinguishable, unless applicant can properly show expected results or some criticality of the membrane dried at 120° C vs. 100° C, as **MPEP 2144.05 [R-5] Section II** states, "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical." As such a variable is in reference to mere drying, examiner believes such an amendment to 120° C is not to claim a critical range but rather to circumvent the prior art of record, which such amendment does not successfully do, as this is a non-patentably distinguishable issue. Applicant attempts to point to the tables of the

Art Unit: 1793

instant specification in order to show superior properties of the instant membrane over conventional membranes. Firstly, such a showing/evidence is not commensurate with the limitation applicant is seeking to show criticality in (i.e. drying temperature). Examiner cannot glean any criticality of a drying temperature of 120° C over 100° C from such tables, as such information is not present. A proper showing of evidence would be some improved properties of the membrane product which has undergone a drying step at 120° C in direct relation to a membrane product which has undergone a drying step at 100° C. As such evidence is lacking, examiner maintains the rejection of such a limitation above, with support from MPEP 2144.05 [R-5] Section II.

Applicant makes no other grounds of argumentation, and thus, applicant's arguments, on the whole, are deemed not persuasive.

Conclusion

10. Claims 13-17, 19-29, and 31-38 are rejected.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 1793

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph V. Micali whose telephone number is (571) 270-5906.

The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry A. Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph V Micali/
Examiner, Art Unit 1793

/J.A. LORENZO/
Supervisory Patent Examiner, Art Unit
1793